Contracting For Laboratory Services

How can you, as a laboratory client, make sure that the results you receive will meet your data quality needs? This question and more are addressed in the User's Guide to Laboratory Services below. Ultimately, your data quality objectives will determine what you expect from your selected lab. Once you determine what types of services you will need, you can locate an appropriate lab using the Department's lists of certified and registered labs.

The Laboratory Certification Program retains copies of all audit reports and laboratory responses for ten years after the audit date. The Laboratory Certification files are located at 101 S. Webster St., G.E.F. III Building, Madison, WI. The general public is welcome to use the files between 7:45 AM and 4:30 PM, Monday through Friday. Although the files cannot be removed, photocopies of original materials are available for a nominal fee. Stop by during normal business hours or contact the program at (608) 267-7633 to set up an appointment.

A User's Guide to Laboratory Services *by Ron Arneson*
The Department of Natural Resources requires numerous industries and municipalities to monitor their discharges (liquid, solid or gas) to surface water, groundwater, soil, and air. In order to do this, industries or municipalities use their own laboratory or contract for these services.

Dr. Bruce B. Burnett of Union Camp Corporation states that:

> *"It is inappropriate to choose a laboratory based on a telephone directory listing, advertising, convenient location to the plant site or even some limited past experience. Union Camp's experience with selection and use of contract laboratories shows that the use of objective criteria for evaluation of a laboratory's qualifications, followed by a continuing testing designed to demonstrate analytical proficiency, can and will produce high quality levels required for regulatory analysis."*

This article is an attempt to explain what questions to ask and what service to request in order to get what you need. You may not have the time or resources to follow all of the advice given here. The hazard you run by not requesting the specific service you need is that you may have to re-sample and reanalyze which could more than double the initial cost.

Laboratory accreditation does not guarantee good quality data or the service you need. What laboratory certification does is to make information available about analytical data quality. This information can be used to help you make your selection of a laboratory. It is your responsibility to determine if a laboratory is producing data of a quality that satisfies your needs.

Many things should be considered when selecting a laboratory. These include:

Accuracy and Precision of Results
Since your sample results will be used to determine compliance with environmental law or the amount of a fee, you will want your results to be as accurate and precise as possible. Each parameter, method, and laboratory has different precision and accuracy. In order to select a laboratory you may ask to see their spike recovery control limits, duplicate control limits, and reference sample results.
Once a laboratory is selected you may want to check their accuracy by sending a routine sample to them that is known to you but not them or by submitting an occasional duplicate sample. Let the laboratory know you intend to do this, but do not identify the sample as a known or a duplicate. This

shows them you are serious about the quality of your data and that you expect them to treat every sample as a test of their ability.

Approved Methods
For most environmental monitoring programs there are approved analytical methods. Unfortunately these methods may vary from program to program. Tell the laboratory what environmental program your samples are under. In addition your permit or monitoring request may specify the methods to be used. Pass this information on to the laboratory.

Sampling Instructions, Bottles and Preservatives
The laboratory should be able to provide you with written instructions on what preservatives to use, which bottles to use, what parameters are compatible and can be collected in the same bottles, whether a grab or composite sample is needed, and may be able to provide shipping containers.

Composite samplers may need to be adapted (teflon lines and glass collection bottles) or portable models borrowed for collection of toxic samples. In some situations it may be desirable that the sampling be contracted out as well.

Sample bottle types (glass, plastic, etc) and/or volumes, along with preservatives, vary from parameter to parameter. You may want your laboratory to provide you with bottles and chemical preservatives.

Any samples that are not preserved properly may result in questionable results and must be qualified as such when reporting results. Having the laboratory supply the bottles will help insure the correct type of bottle and minimize the chance a contaminated bottle is used.

Laboratories that will provide these services will make your job easier!

Proper Identification of Organic Compounds
In organic analysis it is possible to misidentify compounds. This is more likely to happen with gas chromatography (GC) than gas chromatography/mass spectrometry (GC/MS) analysis. This problem can be avoided by confirmation of the analysis. This is done by repeating the analysis under different chromatographic conditions. Most laboratories charge extra for this and will only do it if requested.

If you doubt the analytical results or if other analysis have never shown the identified organics present, ask for confirmation. For permit applications confirmation is highly recommended to avoid a permit limit on chemicals substances that are not present. A continuing record of misidentification may prompt you to look elsewhere for better service.

Reporting Results
The reports you receive from the laboratory should include:

- Concentration units
- Results
- Definitions for abbreviations used
- Date sampled
- Date analyzed
- Method used
- Detection limits
- Location or sample ID # (sample identification information)
- Trip blank results (VOCs only)
- Any special problems encountered during analyses (interferences, insufficient sample, etc.)

If you are dealing with semi-solid samples, such as sediment or sludge, be sure to tell the laboratory if the results should be reported on a wet or dry weight basis.

If you are requesting a large number of parameters to be analyzed, it is appropriate to specify the report format. For example the report could be alphabetical by organic fraction or in the order given on your Discharge Monitoring Report (DMR) form or Turnaround Document.

Accuracy of the report is also important. If you notice frequent problems (such as improperly place decimal points, calculation errors, or improper units) poor data handling is indicated. Notify your laboratory that this is not acceptable and perhaps change laboratories.

Turnaround Time on Results
You may need your lab results back within a specific time period in order to complete and mail your DMR or other report on time. Be sure to tell this to the laboratory.

Holding Times Prior to Analysis
The time from when a wastewater sample is collected to when it is analyzed must not exceed the time given in ch. NR 219 Table F. In order for the laboratory to properly schedule their workload and determine when your sample should be analyzed you must give the laboratory the date and time the sample was collected. If the holding time is exceeded the results are questionable and generally will not be accepted by the Department. The results must be qualified as exceeding the holding times when submitted to the Department.

Accreditation Status
For most environmental monitoring programs a certified or registered laboratory is required. A certified laboratory is one that does testing for hire. If you are contracting for laboratory services you will need a certified laboratory. Be sure to check that the laboratory is certified for the testing you need done. Many laboratories subcontract work to other laboratories due to the fact that they cannot provide the complete service or because of workload. It is acceptable for laboratories to subcontract analyses under the Laboratory Certification Program. The contracting laboratory must ensure that the required quality control and record keeping is done. There is a danger in this for you the client, your sample may get lost in the shuffle, holding times may be exceeded, etc.

Experience/Qualifications
Check with the laboratories you are considering to see how much experience they have in analyzing your type of sample. This experience is helpful when dealing with complex samples. Also ask for references and contact those references to see what they think about the laboratory. Visit the laboratory to get an idea of what you're paying for and if what they're telling you is correct. Be sure to take a look at their records, are they easy to read, do they make sense.

Detection Limits
The laboratory will need to know what detection limits (LOD) are required to meet your permit limits. To get the service you need, be sure to give the laboratory the information the Department supplies you with (e.g., sampling requirements, permit limit, methods, detection limits, etc.).

When the Department suggests a method it is because that method has the necessary limit of detection. If there are interferences present, all steps in the method should be followed to remove the interferences, such as sample clean-up or standard addition. Many laboratories charge extra for sample clean-up and will only do it if requested.

If the detection limits on the submitted data do not meet the Department needs, you may be asked to retest.

Price
Price may vary widely for laboratory services. When asking for bids you need to make sure the services you need are provided. There may be hidden cost (such as additional cost for sample clean-up, standard addition, confirmation, or reporting of quality control results), so be sure to ask what these cost are. The lowest price may not save you any money if you need to retest because of questionable results or if the detection limits are not low enough. The highest price may not be what you need either. The important factor is not the price. Do not let the cost of the analysis be the deciding factor for the laboratory you choose.

Additional Reading

- Einerson, J.H.; Pei, P.C.; A Comparison of Laboratory Performances; Environ. Sci. Technol., Vol. 22, No. 10, p. 1121, 1988.
- Rice, G.; Brinkman, J.; Muller, D.; Reliability of Chemical Analyses of Water Samples -- The Experience of the UMTRA Project; Groundwater Monitoring Review, Summer, 1988.
- Burnett, B.; Laboratory Certification; Proceedings of the 1988 National Council of the Paper Industry for Air and Stream Improvement (NCASI) Southern Regional Meeting, Special Report 88-02, pp. 183-192, October 1988.

Contracting for Lab Services
The Laboratory Certification Program keeps copies of all audits and responses for ten years after the audit date, along with other information about certified labs including QA Manuals, reference samples and applications. Everyone is welcome to come in and look at the files.
The following are some things to consider when choosing a laboratory for a project (in no particular order):

Consultant's Checklist
Information available from the LabCert program

- ✔ Is the laboratory certified for the parameters you need? Verify their certification status by contacting the LabCert Program or checking their certification status on line.
- ✔ When was their last audit? Ask the lab to supply this information with their bid, or contact the LabCert Program to schedule an appointment to review audit records.
- ✔ How did the lab perform on its last audit? Did they address all of the cited deficiencies?
- ✔ How did the laboratory do on recent PT sample results? Does the lab have a history of chronic PT sample failure?
- ✔ Are there any outstanding enforcement actions against this lab and if so, do they affect your project?

Information available from the LabCert program

Information That is Available from the Lab

- ✔ Does the laboratory follow the necessary approved methods? Ask the lab for an updated version of their QA manual and applicable SOPS (if necessary).
- ✔ Can the lab meet the required holding times prior to analysis? What is their history on meeting holding times?
- ✔ What is the turnaround time on results? Does this meet your project's requirements? Will your project get "bumped" for higher priority items? Talk to the lab director and explain your needs.
- ✔ Can the laboratory achieve the appropriate detection levels for the project? Ask the lab to supply detection limit information with their bid.
- ✔ Does the laboratory regularly achieve the desired accuracy and precision of results for your project? Ask the lab for their control limits and other quality control data.

- ✔ How are results reported? Are quality control failures flagged appropriately? Does the lab offer several different "levels" of reports? Which one meets your project's requirements?
- ✔ What experience/qualifications are present in the lab's staff? Ask to see biographies of key employees.
- ✔ Ask the lab to supply references, and check with the references to get their opinion of the lab's service.
- ✔ Finally, how does the laboratory compare in price to other labs? Does the lab charge more for more detailed reports? Does the lab charge extra for confirmation analysis? Ask the lab about any "extra" charges you may incur, and remember, that re-sampling usually ends up costing you… not the laboratory…more.